

2.4 Population Dynamics

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS rate of natural increase 自然增长率 • doubling time 倍增时间
• total fertility rate 总和生育率 • migration 迁移 • infant mortality rate 婴儿死亡率

Objective

Build the skills to answer exam questions on **population dynamics** 人口动态 — birth, death, and growth rates.

You must be able to:

- define **crude birth rate** 粗出生率 (CBR), **crude death rate** 粗死亡率 (CDR), and **rate of natural increase** 自然增长率 (RNI)
- define **total fertility rate** 总和生育率 (TFR) and **infant mortality rate** 婴儿死亡率 (IMR)
- calculate RNI from CBR and CDR
- explain **doubling time** 倍增时间

1 Worked examples

Study these first. Each one shows the method for a task used later.

■ Key rates

CBR = births per 1,000 people per year. **CDR** = deaths per 1,000. **RNI** = (CBR – CDR) ÷ 10, as a percent (migration excluded).

■ TFR and IMR

TFR = average children per woman; a TFR near **2.1** is replacement level. **IMR** = deaths under age 1 per 1,000 live births — a strong indicator of development.

■ Doubling time

Doubling time $\approx 70 \div \text{RNI}$ (in %). An RNI of 2% doubles a population in about 35 years.

2 Practice

2.1 Define the rate of natural increase. [2]

2.2 A country has a CBR of 30 and a CDR of 10. Calculate its RNI. [2]

2.3 Country Y has a TFR of 1.6.

(a) State whether this is above or below replacement level. [1]

(b) Predict what happens to the population size over time, ignoring migration. [1]

3 Exam-style questions

3.1 Replacement-level fertility is a total fertility rate of about [1]

- | | |
|---|---|
| A | B |
| C | D |
- A 0.5
B 1.0
C 2.1
D 4.0

3.2 With an RNI of 2% per year, the population doubles in roughly [1]

- | | |
|---|---|
| A | B |
| C | D |
- A 7 years
B 35 years
C 70 years
D 140 years

3.3 A country's infant mortality rate falls sharply over 20 years.

(a) State what IMR measures. [1]

(b) Explain what the fall suggests about development. [1]